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Lubrication Engineer

NATIONAL LUBRICATING GREASE INSTITUTE

VOLUME V • NUMBER 5 AUGUST, 1941

Check the Air!

For Greater Economy, Safety and Better Performance, Keep All Four Tires Inflated to the Proper Pressures as Recommended by the Car Manufacturer.

By William Ruskamp Jr.,
Chek-Chart Associate Editor

We've all heard the howl of the under-inflated tire taking a corner—experienced the drag of a flat and heard the boom of a blow-out. Some people know these things can be caused by improper inflation of the tires (too little pressure—or too much) but to most—"Checking the Air", still means adding more—many times by eye—without benefit of a gage.

To a few of them it's merely one of those quaint expressions used by the people found around garages and service stations. Maybe the omnipresent sign, FREE AIR, makes it seem a thing of small importance—something that is good for others, but concerns them not at all.

However that may be, a realization of the importance of maintaining tire pressures as recommended by the car manufacturer is as necessary to their riding comfort and the economical and safe operation of their car as any other single item coming under the head of "Service".

Pressure recommendations are all based on certain carefully considered factors such as: balance between springs, shock absorbers and tires, and the friction necessary for proper braking and starting as related to tire economy, ease of steering and ride.

When tire pressures are allowed to drop below, or rise above the manufacturer's recommendations, the proper balance between working parts is destroyed.

* * *

As the Degree of Inflation Drops—the Rate of Tire Wear and Gasoline Consumption Goes up

A properly inflated tire will give about 20,000 miles of satisfactory service. The same tire only 90% inflated will last for about 18,000 miles and for only 12,500 miles when the pressure is 80% of normal.

The side walls of a tire which is under-inflated, flex more and to a greater extent than those of a properly inflated tire. This flexing produces considerable heat and causes the side walls to break down prematurely. Due to this abnormal flexing every hole in the road and every curb with which the tire comes in contact, damages it since the casing is flexed beyond the point of safety. The direct result of such a condition may be a break in the cord which is responsible for more tire failures than any other single cause.

The air in a tire seeps out to a very slight extent through the pores in the rubber, but to a much greater extent through the valve core and valve cap. The normal seepage through a new tire will amount to two or three pounds a week.

* * *

To Maintain the Proper Pressure It Is Necessary to Check the Tire at Least Once a Week

* * *

In checking a tire, due consideration must be given to the gage used. A tire gage is a precision instrument and easily damaged, therefore care should be exercised in protecting it from shock or rough usage. As a protective measure a gage should be checked from time to time with a master gage and corrected whenever necessary. Only by using an accurate gage can tires be maintained at the manufacturer's recommended pressures.

A valve core is employed in the valve stem to assist in checking, adding to or lowering the air pressure in the tire. It is not a seal to keep the air in, but simply a checking device. To properly seal the air in a tube a valve cap must be used. Besides doing this, a valve cap also prevents dirt, water or other foreign materials from damaging the valve core or entering the tube. The cap should be kept tight if it is to function properly. A valve cap which is tightened down with the fingers will seal a pressure of 250 pounds.

* * *

From Time to Time the Valve Core and Cap Should Be Inspected and Replaced if Damaged

* * *

Under-inflation causes excess friction between the tread and the road and excess flexing of the side walls and tread, both resulting in higher operating temperatures.

Heat is produced in three ways in a tire; by absorption (from the road and from the sun), by friction of the tire on the road, and by flexing of the side wall and tread. The absorbed heat cannot be compensated for. But the heat caused by friction between the tire and the road and the flexing of the side walls can be minimized by proper inflation.

A tire operating at an atmospheric temperature of 100° will wear out five times as fast as the same tire operating at 40°.

A tire which is over-inflated places an unnecessary strain on the carcass which ultimately weakens it and may cause a blow-out. Besides this danger the car will ride "hard" resulting in broken springs, prematurely worn out or broken shock absorbers, damaged mechanical parts and in general a transfer of more road shock to the car than was intended by the manufacturer for safe, economical and satisfactory performance. The center of the tread will be worn out prematurely, tire slippage and skidding will be excessive, and brake efficiency reduced. Too hard a tire will make the car bounce out of a rut and if going fast enough it may bounce off the road or into the path of an oncoming car.

* * *

The Degree of Over-inflation and Tire Costs Go Up Together While Safety Economy and Performance Go Down

* * *

The importance of maintaining correct tire pressures all around the car cannot be over-emphasized. To allow any one tire to become under or over-inflated will destroy the balance between working parts. A tire which is not properly inflated on a front wheel will result in unbalanced steering and breaking. Such a condition could result in an accident. Unbalanced inflation of tires destroys the balance between springs, stabilizers and shock absorbers, thus preventing them from providing the safety and satisfactory performance which they are intended to accomplish. A rear tire which is not properly inflated will reflect itself in unbalanced braking and poor riding qualities.

There is no formula for calculating the correct pressure for any certain size of tire. Using a 6.00 x 16 tire we find that, in the last five years, the manufacturers using this size tire make the following recommendations for passenger cars:

TIRE PRESSURES FOR 6.00 x 16 TIRES

Front	Rear	Front	Rear
26	28	26	26
28	28	27	27
24	30	25	30
30	30	27	32
24	28	28	30
24	32	33	33
26	30		

This table shows 13 different sets of pressures; seven for the front with a spread of 9 lb., and six for the rear with a spread of 7 lb.

Five manufacturers recommend the same pressure be carried front and rear, eight recommend a separate set of pressures for the front and rear tires.

At first glance it would seem very simple to figure, that as long as there is only such a small difference in the recommended pressures, an average pressure could be used for all tires of this size. But, when you stop to think that the car manufacturers, in line with today's trend toward simplification, would be only too glad to join with the tire manufacturers in standardizing on a single set of pressures based on the size of the tire, you can readily see how important they both feel is this problem of proper tire pressures.

* * *

To Properly Inflate a Tire for a Particular Car the Manufacturer's Recommend Pressures Must Be Known

Better Than the Dinner Bell

Better than the dinner bell to bring the farm hands running is a service station on wheels, complete to free air and water, now doing yoeman work on a 40,000-acre California farm.

Gasoline, diesel oil, two grades of engine oil, chassis lubricant, and gear oil, all in separate tanks, are mounted on a 1½-ton truck and carried around on regular schedule. Two adjustable floodlights for night servicing, a water tank, an air compressor, power pumps, meters, and three service hoses, make the unit complete for servicing tractors and other mechanized units at isolated points.

Tractors are met in the fields at regular intervals and not only are serviced, but are given minor repairs and adjustments. Time required has been reduced from an hour and a half to 15 minutes. The mobile station operates in two shifts and averages 30 to 50 miles a day. In 1939 one farm alone used 35,000 gallons of gasoline, 25,000 gallons of diesel fuel, 2,000 gallons of engine oil, 6,500 pounds of grease and 175 gallons of kerosine.

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ADAMS OF THE NAVY RESEARCH DIVISION

AFTERNOON SESSION

"COMMITTEE ACTIVITIES AND THEIR RELATION TO THE NATIONAL DEFENSE EFFORT"
L. C. WELCH, *Chairman,* Lubrication Committee, A. P. I.

"DISCUSSION OF ANTI-FRICTION BEARING LUBRICANTS"
O. L. MAAG — Timken Bearing Co.

"COST ACCOUNTING AS APPLICABLE TO THE GREASE INDUSTRY"
E. V. MONCRIEFF — Swan-Finch Oil Corp.

"LABORATORY METHODS FOR EVALUATING GREASES"
G. CAUFFMAN — The Texas Co.

"IMPORTANCE OF SOUND ACCOUNTING METHODS AND WHAT THEY MEAN TO MANAGEMENT"
Speaker from the American Institute of Accountants

5 P. M.—COCKTAIL HOUR—TOWER BALL ROOM

MONDAY EVENING ANNUAL BANQUET — 7 P. M.

ENTERTAINMENT DELUXE

TUESDAY, SEPTEMBER 30—MORNING SESSION

TALK ON MODERN PACKAGING BY ONE QUALIFIED TO TALK

"LABORATORY PENETRATION METHODS"
C. M. LARSON — Sinclair Refg. Co.

"CHEMISTRY OF ADDITIVES FOR PETROLEUM PRODUCTS"
DR. C. F. PRUTTON — Lubri-Zol Corp.

"BALL BEARING LUBRICATION"
H. M. FRASIER — International Lubricant Corp.

DISCUSSION OF DEFENSE ACTIVITIES AS RELATED TO THE GREASE INDUSTRY
LT. COL. M. B. CHITTICK — U. S. Army Chemical Warfare Division

AFTERNOON SESSION

Annual Business Session for Active Members Only, Report of Committees, Election of Directors. Adjournment.

STEVENS HOTEL - CHICAGO, ILL.
SEPTEMBER 29, 30, 1941

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Union Oil Company of California Makes New Appointment

Appointment of R. Cubicciotti as assistant sales manager for Union Oil Company of California has been announced by A. C. Stewart, vice-president of the company. In assuming his new duties, Cubicciotti, who formerly acted as manager of lubricant sales, will be in charge of lubricants, refined oil and technical product sales.

Receiving his B. S. degree in chemical engineering from the University of California in 1925, he became associated with Union Oil the following year in an engineering capacity at the company's Oleum refinery. Four years later he was appointed technical assistant to the refinery manager. In 1932 he was transferred to the company's head office in Los Angeles as assistant manager of lubricants and special products, which position he held until 1936 when he was appointed manager lubricant sales.

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(*Continued on page 8*)

* Courtesy Society Automotive Engineers

*The Petroleum Tree**

From the original three products of 60 years ago the Petroleum "Tree" has grown until today many hundreds of products and by-products are refined from crude oil. Some of these products are shown in the "Tree" on the opposite page, and the more common uses for these are listed below.

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Heavy Fuel Oil—fuel for boilers, industrial uses. **De-Emulsifying Agent. Saponification Agent. Acid Sludge Oil**—denaturant.

BRANCH B

HEAVY LUBRICATING OILS: **Journal Oil**—lubricating railway journals. **Motor Oil**—lubricating internal combustion engines. **Cylinder Oil**—lubricating steam cylinders. **Valve Oil** lubricating valves of steam engines. **Transmission Oil**—gear lubricant. **Black Oil**—mine car lubrication. **Grease Compounding Oil**—manufacture of heavy gear grease, heavy axle grease, railroad switch grease, elevator cable grease.

ASPHALTS: **Steam-Reduced Asphalts**—roof coating, waterproofing asphalt, insulating asphalt. **Oxidized Asphalts**—briquetting asphalt, paving asphalt, shingle saturant, paint base, mastic flooring, roofing saturant. **Liquid Asphalts**—road paving, road oil, emulsion base.

COKE: **Brush Coke**—brushes for electrical equipment. **Fuel Coke**—domestic fuel and carborundum manufacture. **Electrode Coke**—manufacture of carbon electrodes.

PETROLATUM: **Salve**—pharmaceutical. **Cream**—cosmetics. **Ointment**—pharmaceutical. **Petroleum Jelly**—pharmaceutical. **Metal Coating**—anti-rust compounds. **Lubricant**—ammunition manufacture. **Cable Coating**—electrical and mining industries.

SODIUM SULFONATE: preparation of water-soluble textile oils.

BRANCH C

RESIDUAL FUEL OIL: **Wood Preservative**—impregnation of railroad ties. **Boiler Fuel**—firing boilers.

BRANCH D

NAPHTHENIC ACID: **Emulsifier**—manufacture of textile oils.

LUBRICATING OILS: **Printing Ink Oil**—vehicle for printing ink ingredients. **Floor Oil**—dust layer for wooden floors. **Tempering Oil**—processing of metals. **Turbine Oil**—lubrication of steam turbines. **Meter Oil**—lubrication of meters. **Grease Oil**—manufacture of cup grease, light axle grease, light gear grease, mill grease. **Ice Machine Oil**—lubrication of ice machines and domestic refrigerators. **Compressor Oil**—lubrication of air and gas compressors. **Household Oil**—general purpose lubricating oil. **Motor Oil**—lubrication of internal combustion engines and electric motors. **Spindle Oil**—textile machinery.

TECHNICAL HEAVY OIL: **Flotation Oil**—mining and milling operations. **Switch Oil**—oil-immersed electrical switches. **Transformer Oil**—insulation in electrical transformers. **Cutting Oil**—metal working. **White Oil**—ointment (pharmaceutical), cosmetics cream, salve (pharmaceutical) medicinal purposes, egg-packers oil, fruit-packers oil, candy-makers oil, bakers' machine oil, tree spray oil. **Textile Oil**—lubrication of textile fibres.

WAX: **Floor Wax**—ingredient of floor wax. **Canning Wax**—domestic preserving. **Etchers Wax**—etching of glass and metal. **Laundry Wax** — starching and ironing operations. **Candy-makers Wax**—various candy-making operations. **Candle Wax**—candles. **Insulating Wax**—insulating electric cables. **Medical Wax**—various medical and laboratory uses. **Chewing Gum Wax**—manufacture of chewing gum. **Saturating Wax**—wax paper, match wax, cardboard wax.

BRANCH E

Absorber Oil—menstruum in petroleum and coal gas industries. **Gas Oil**—manufacture of house gas and high octane motor fuel. **Household Fuel**—domestic heating. **Industrial Fuel**—industrial operations (heating, smelting, etc.). **Diesel Fuel Oil**—fuel for Diesel engines. **Carburetion Oil**—enrichment of water gas. **Motor Fuel**—fuel for internal combustion engines.

BRANCH F

NAPHTHAS: **Naphtha Soap**—laundry work. **Turpentine Substitute** — manufacture of paints. **Cleaners Naphtha** — dry cleaning. **Varnish and Paint Naphtha**—varnish and paint manufacture. **Lacquer Diluent**—manufacture of lacquers. **Fatty Oil Solvent**—degreasing and extraction processes (animal and vegetable fats and oils). **Rubber Solvent**—rubber cement. **Aviation Fuel**—high octane aviation gasoline. **Drug Extractor**—extraction of drugs from medicinal plants and herbs. **Gas Machine Naphtha**—lighting and domestic cooking. **Motor Fuel**—fuel for internal combustion engines.

REFINED OILS: **Tractor Fuel**—fuel for tractors (internal combustion. **Stove oil**—domestic heating and cooking. **Kerosene**—lamps, stoves. **Ship Illuminant**—ship lamps. **Lighthouse Oil**—lighthouse lamps. **Railroad Signal Oil**—railroad signal lamps. **Fly Spray**—insect repellant. **Insecticide**—agricultural spraying.

BRANCH G

HYDROGEN SULPHIDE: **Sulphuric Acid**—storage battery acid.

BRANCH H

ALCOHOLS: **Ethyl Alcohol**—industrial solvent. **Ethyl Acetate**—industrial solvent. **Hexyl Alcohol**—industrial solvent. **Amyl Alcohol**—industrial solvent. **Butyl Alcohol**—industrial solvent. **Iso Propyl Alcohol**—industrial solvent. **Naphthalene**—moth repellant, insecticide.

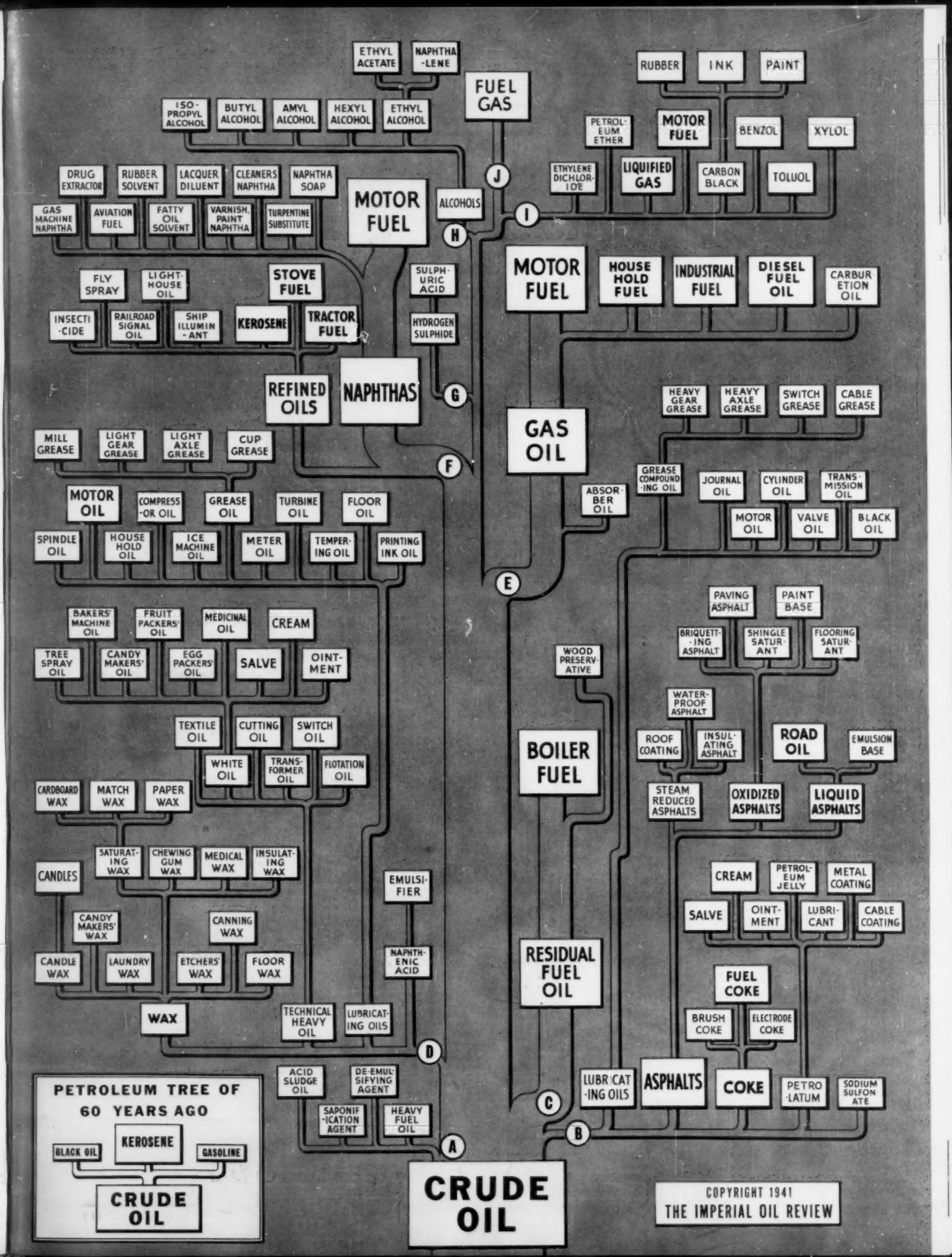
BRANCH I

Ethylene Dichloride—synthetic rubber. **Petroleum Ether**—extraction of fats. **Liquified Gas**—domestic heating. **Motor Fuel**—fuel for internal combustion engines. **Carbon Black**—manufacture of rubber, ink, paint. **Benzol**—industrial solvent. **Toluol**—explosives, paint solvent. **Xylol**—solvent.

BRANCH J

FUEL GAS.

*Courtesy Imperial Oil Review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NAPHTHAS
MOTOR FUEL
FUEL GAS
ALCOHOLS
WAX
ACID SLUDGE OIL
DE-EMULSIFYING AGENT
SAPONIFICATION AGENT
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TECHNICAL HEAVY OIL
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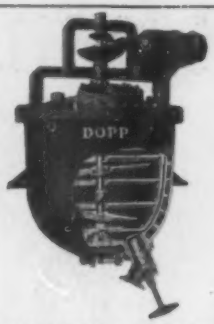
CANDY MAKERS' WAX
LAUNDRY WAX
SATURATING WAX
CHEWING GUM WAX
MEDICAL WAX
INSULATING WAX
CANNING WAX
ETCHERS' WAX
FLOOR WAX
CARDBOARD WAX
MATCH WAX
PAPER WAX
TEXTILE OIL
CUTTING OIL
SWITCH OIL
WHITE OIL
TRANSFORMER OIL
FLOTATION OIL
BAKERS' MACHINE OIL
TREE SPRAY OIL
CANDY MAKERS' OIL
FRUIT PACKERS' OIL
EGG PACKERS' OIL
MEDICINAL OIL
SALVE
CREAM
OINTMENT
SPINDLE OIL
HOUSE HOLD OIL
ICE MACHINE OIL
METER OIL
TEMPERING OIL
PRINTING INK OIL
MILL GREASE
LIGHT GEAR GREASE
LIGHT AXLE GREASE
CUP GREASE
GREASE OIL
TURBINE OIL
FLOOR OIL
COMPRESSOR OIL
SULPHURIC ACID
HYDROGEN SULPHIDE
STOVE FUEL
KEROSENE
TRACTOR FUEL
FLY SPRAY
INSECTICIDE
LIGHTHOUSE OIL
RAILROAD SIGNAL OIL
SHIP ILLUMINANT
GAS MACHINE NAPHTHA
AVIATION FUEL
FATTY OIL SOLVENT
VARNISH, PAINT NAPHTHA
TURPENTINE SUBSTITUTE
DRUG EXTRACTOR
RUBBER SOLVENT
LACQUER DILUENT
CLEANERS NAPHTHA
NAPHTHA SOAP
ISOPROPYL ALCOHOL
BUTYL ALCOHOL
AMYL ALCOHOL
HEXYL ALCOHOL
ETHYL ALCOHOL
ETHYL ACETATE
NAPHTHALENE
ETHYLENE DICHLORIDE
PETROLEUM ETHER
LIQUIFIED GAS
CARBON BLACK
TOLUOL
BENZOL
XYLOL
RUBBER
INK
PAINT
MOTOR FUEL
HOUSE HOLD FUEL
INDUSTRIAL FUEL
DIESEL FUEL OIL
CARBURETION OIL
ABSORBER OIL
GREASE COMPOUNDING OIL
JOURNAL OIL
CYLINDER OIL
TRANSMISSION OIL
MOTOR OIL
VALVE OIL
BLACK OIL
HEAVY GEAR GREASE
HEAVY AXLE GREASE
SWITCH GREASE
CABLE GREASE
WOOD PRESERVATIVE
PAVING ASPHALT
PAINT BASE
BRIQUETTING ASPHALT
SHINGLE SATURANT
FLOORING SATURANT
WATERPROOF ASPHALT
ROOF COATING
INSULATING ASPHALT
ROAD OIL
EMULSION BASE
STEAM REDUCED ASPHALTS
OXIDIZED ASPHALTS
LIQUID ASPHALTS
CREAM
PETROLEUM JELLY
METAL COATING
SALVE
OINTMENT
LUBRICANT
CABLE COATING
FUEL COKE
BRUSH COKE
ELECTRODE COKE



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